

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application)	
No. 10/056,278)	For: SELECTIVE COMBINING OF
)	MULTIPLE NON-
)	SYNCHRONOUS
Tao Chen)	TRANSMISSIONS IN A
)	WIRELESS COMMUNICATION
Examiner: Eugene YUN)	SYSTEM
)	
Filed: January 23, 2002)	Group No. 2618

REPLY BRIEF ON APPEAL

Submitted Via Electronic Mail on September 17, 2007

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Board of Patent Appeals and Interferences

Sirs:

This reply brief is submitted pursuant to 37 C.F.R. § 41.37 and in the format required by 37 C.F.R. § 41.37(c) and with the fee required by 37 C.F.R. § 41.20(b)(2).

(1) REAL PARTY IN INTEREST

The real party in interest in the present pending appeal is Qualcomm, Inc., the assignee of the pending application as recorded at Reel 012794 Frame 0486 with the United States Patent and Trademark Office (Patent Office).

(2) RELATED APPEALS AND INTERFERENCES

Neither Appellant, Appellant's representative, nor Assignee is aware of any pending appeal or interference which would directly affect, be directly affected by, or have any bearing on the Board's decision in the present pending appeal.

(3) STATUS OF CLAIMS

Claims 1-12 and 14-27 are pending in the application.

Claims 1-12 and 14-27 stand rejected.

The rejections of claims 1-12 and 14-27 are being appealed.

(4) STATUS OF AMENDMENTS

A Final Office Action was mailed on March 27, 2006.

No amendment under 37 C.F.R. §1.116 in response thereto was filed.

A Notice of Appeal was filed on September 27, 2006.

Accordingly and consistent with Appellant's efforts to advance prosecution on the merits, the present Appeal Brief is responsive to all of the rejections of the Final Office Action.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

With respect to independent claim 1 and referring to FIGS. 1-8, the present invention as claimed is directed to a method for selectively combining a plurality of received transmissions from a plurality of respective signal sources to recover a message comprised of a plurality of frames. (Specification, FIG. 5, paragraphs [1025, 1054]; page 6, lines 3-10, page 13, line 29-page 14, line 2). The method for selectively combining includes processing 512, 520 each of the plurality of received transmissions from the plurality of respective signal sources separately to recover the message. (Specification, FIG. 5, paragraphs [1055-6], page 14, lines 3-20). The method further includes if the message cannot be recovered error-free from a single received transmission, determining 514, 518, 520 erased frames in a message recovered from a first received transmission and determining 514, 518, 520 good frames recovered from remaining ones of the plurality of received transmissions. (Specification, FIG. 5, paragraphs [1057-8], page 14, line 21-page 15, line 7). The method if the message cannot be recovered error-free further includes forming 536 at least one combined message, wherein each combined message includes a particular combination of good frames substituting for the erased frames, and checking 538 each combined message to determine whether it is good or erased. (Specification, FIG. 5, paragraphs [1060-2], page 15, lines 8-32).

With respect to independent claim 18 and referring to FIGS. 1-8, the present invention as claimed is directed to a method for selectively combining a plurality of non-synchronous forward link received transmissions from a plurality of respective signal sources to recover a page message comprised of a plurality of frames. (Specification, FIGS. 5 and 7, paragraph [1071], page 17, lines 28-32). The method includes processing 512, 632, 732 each of the plurality of non-synchronous forward link received transmissions from the plurality of respective signal sources separately to recover the page message. (Specification, FIGS. 5-7, paragraph [1054], page 13, line 29-page 14, line 2). The method further includes if the page message cannot be recovered error-free from a single received transmission, determining 514, 518, 520, 634, 734 erased frames in a message recovered from a first non-synchronous forward link received transmission, based on 514 734, 638, 738 a set of cyclic redundancy check (CRC) bits included with each frame, and determining 514, 638, 738 a good frame, recovered from one of the plurality of non-synchronous forward link received transmissions, for each erased frame. (Specification, FIGS. 5-7, paragraph [1072], page 18, lines 1-5). The method if the page message cannot be recovered error-free from a single received transmission further includes forming 536, 642, 742 a combined message by substituting each erased frame with a corresponding good frame and checking 538, 644, 744 the combined message based on a set of CRC bits included with the message to determine whether it is good or erased. (Specification, FIGS. 5-7, paragraph [1073], page 18, lines 6-15).

With respect to independent claim 19 and referring to FIGS. 1-8, the present invention as claimed is directed to a receiver unit 300. (Specification, FIG. 3, paragraph [1033], page 7, line 31-page 8, line 13). The receiver unit 300 includes a demodulator 316 operative to receive and process a plurality of signal instances in a received signal to provide a plurality of symbol streams, each symbol stream corresponding to a respective received transmission from one of a plurality of respective signal sources included in the received signal. (Specification, FIG. 3, paragraphs [1033-5], page 7, line 31-page 8, line 33). The receiver unit 300 further includes a decoder 318 operative to process each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames, a first detector 322 operative to detect each frame in each recovered message as either a good frame or an erased frame, a second detector 328 operative to detect each recovered message as either a good message or an erased message, and a frame assembler 324 operative to form at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream and wherein the second detector 328 is further operative to detect each combined message as either a good message or an erased message. (Specification, FIG. 3, paragraphs [1036-8], page 9, lines 1-33).

With respect to independent claim 26 and referring to FIGS. 1-8, the present invention as claimed is directed to a digital signal processor. (Specification, FIG. 3, paragraph [1088], page 22, lines 1-10). The digital signal processor 300 includes means for processing 512, 520 a plurality of signal instances in a received signal to provide a plurality of symbol streams, wherein each symbol stream corresponds to a respective received transmission from one of a plurality of respective signal sources included in the received signal. (Specification, FIG. 3, paragraph [1035], page 8, lines 22-33). The digital signal processor further includes a means for decoding 318 each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames, means for detecting 322 each frame in each recovered message as either a good frame or an erased frame and means for detecting 328 each recovered message as either a good message or an erased message. (Specification, FIG. 3, paragraphs [1036-8], page 9, lines 1-33). The digital signal processor further includes a means for forming 324 at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream, and wherein each combined message is detected to determine if it is a good message. (Specification, FIG. 3, paragraphs [1036-9], page 9, lines 1-33).

With respect to independent claim 27 and referring to FIGS. 1-8, the present invention as claimed is directed to a receiver apparatus. (Specification, FIG. 3, paragraph [1033], page 7, line 31-page 8, line 13). The receiver apparatus 300 includes means for processing 512, 520 a plurality of signal instances in a received signal to provide a plurality of symbol streams, wherein each symbol stream corresponds to a respective received transmission from one of a plurality of respective signal sources included in the received signal. (Specification, FIG. 3, paragraph [1035], page 8, lines 22-33). The receiver apparatus 300 further includes a means for decoding 318 each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames, means for detecting 322 each frame in each recovered message as either a good frame or an erased frame and means for detecting 328 each recovered message as either a good message or an erased message. (Specification, FIG. 3, paragraphs [1036-8], page 9, lines 1-33). The receiver apparatus 300 further includes means for forming 324 at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream, and wherein each combined message is detected to determine if it is a good message. (Specification, FIG. 3, paragraphs [1036-9], page 9, lines 1-33).

(6) GROUND OF REJECTION TO BE REVIEWED ON APPEAL

(1) Whether claims 1, 3, 6-8, 19, 20, 22, 26 and 27 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,335,933 (hereinafter “the Mallory reference”) in view of U.S. Patent No. 5,446,759 (hereinafter “the Campana reference”).

(2) Whether claims 2, 9-12, 14-17, 21, 24 and 25 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,335,933 (hereinafter “the Mallory reference”) in view of U.S. Patent No. 5,446,759 (hereinafter “the Campana reference”) and further in view of U.S. Patent No. 5,920,553 (hereinafter “the Keskitalo reference”).

(3) Whether claims 4, 5, 18 and 23 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,335,933 (hereinafter “the Mallory reference”) in view of U.S. Patent No. 5,446,759 (hereinafter “the Campana reference”) and further in view of U.S. Patent No. 6,286,122 (hereinafter “the Alanara reference”).

(7) ARGUMENT

A. Authorities Relied Upon

(1) 35 U.S.C. §103

To establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a), three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

It is improper to combine references where the references teach away from their combination. MPEP § 2145 (citing *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983)).

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert.denied*, 469 U.S. 851 (1984).

The Federal Circuit has repeatedly cautioned against employing hindsight by using the appellant's disclosure as a blueprint to reconstruct the claimed invention out of

isolated teaching of the prior art. *See, e.g., Grain Processing Corp. v. American-Maize Prods. Co.*, 840 F.2d 902, 907, 5 U.S.P.Q.2d 1788, 1792 (Fed. Cir. 1988).

The nonobviousness of an independent claim precludes a rejection of a claim which depends therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03.

B. Summary of Cited Prior Art

The Mallory reference teaches or suggests a frame-switched network wherein a sender sends frames to a receiver over a possibly unreliable channel. (Mallory Abstract). Using a frame identifier, the receiver determines if an interim frames were lost and sends a negative acknowledgement (NACK) when frames were in fact lost. (Mallory Abstract). Otherwise, no acknowledgement is sent when no frames were lost. (Mallory Abstract).

The Campana reference teaches or suggests multiple transmitters for servicing a geographic region. (Campana, col. 57, lines 18-26). The transmitted message is time delayed resulting in a doubly transmitted message. (Campana, FIG. 8). The doubly transmitted message is not transmitted from a plurality of sources but rather is transmitted from a single source. (Campana, FIGS. 7A-7B). Any replacement of a faded message portion is replaced by data from the repeated message transmitted from the same single transmission source. (Campana, FIG. 33).

The Keskitalo reference teaches or suggests simultaneous connection with one or more base stations and monitoring any of the simultaneous connections for frame

identifiers. (Keskitalo Abstract). The received signals may be ranked by the receiver according to properties such as received signal strength. (Keskitalo, col. 5, lines 41-44).

The Alanara reference teaches or suggests a method for operating a mobile station that includes error detection and error correction of the message words. (Alanara Abstract). The error detection and error correction are accomplished using cyclical redundant coding (CRC). (Alanara Abstract).

C. Arguments for Patentability of Claims 1, 3, 6-8, 19, 20, 22, 26 and 27

- (1) *Claims 1, 3, 6-8, 19, 20, 22, 26 and 27 are patentable because the cited reference does not teach or suggest all of the claim limitations.*

Claims 1, 3, 6-8, 19, 20, 22, 26 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Mallory reference in view of the Campana reference.

Appellant respectfully traverses this rejection, as hereinafter set forth.

To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicants' disclosure." In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Appellant respectfully submits that a prima facie case of obviousness has not been established regarding claims 1, 3, 6-8, 19, 20, 22, 26 and 27 because the prior art cited does not teach or suggest all the claim limitations. Specifically, the cited prior art does not disclose or suggest Appellant's claim elements of *"each combined message includes*

a particular combination of good frames substituting for the erased frames” and “plurality of received transmissions from the plurality of respective signal sources” (Independent claim 1) or *“a plurality of symbol streams, ... each symbol stream correspond[ing] to a respective received transmission from one of a plurality of respective signal sources”* (Independent claims 19, 26, 27) as recited in Appellant’s invention as presently claimed.

The Final Office Action concedes:

Mallory does not teach combining a plurality of received transmissions from a plurality of respective signal sources to recover a message comprised of a plurality of frames and processing the received transmissions from the plurality of respective signal sources separately to recover the message. (Final Office Action, p. 3; emphasis added).

The Final Office Action alleges:

Campana teaches combining a *plurality of received transmissions from a plurality of respective signal sources* to recover a message comprised of plurality of frames and processing the received transmissions from the plurality of respective signal sources separately *to recover the message* (see col. 59, lines 21-63 and multiple sources 124 in fig. 11 and the process of replacing error frames in fig. 33). (Final Office Action, p. 3; emphasis added).

Appellant respectfully submits that the Campana reference is misconstrued and thereby inappropriately applied to Appellant’s claims.

Appellant specifically claims, for example in claim 1, recovering messages, among other things, by substituting “good frames” from one received transmission “for the erased frames” from another received transmission. “[E]ach of the plurality of received transmissions” is further recited in claim 1 as “from the plurality of respective signal sources.”

The *multiple sources* 124 in Fig. 11 of *Campana, Jr.* is not for a receiver to recover messages by substituting good frames from one received transmission of one signal source for the erased frames from another received transmission of another signal source. Instead, in the Campana reference the multiple sources are installed for a different purpose, more specifically, the multiple sources 124 are implemented for adequate communication coverage of a geographic area (Campana, column 57, lines 18-26). In the Campana reference, a message is doubly transmitted but delayed by a time delay interval (Fig. 8 and the relevant description of the Campana reference). However, the doubly transmitted message is transmitted not from a plurality of signal sources but rather from one source (Campana, Figs. 7A and 7B and the relevant description). Since each message is segmented, duplicated, and interleaved, each of the duplicated segment is separated by a time delay within the same message and then *transmitted out of the same signal source*. Repair of defective data segment is replacement of the delayed counterpart out of the *same message from the same signal source* (Campana, Fig. 33 and the relevant description). In other words, each receiver 104 receives a transmission from a single signal source 124.

Nowhere in the Mallory reference or the Campana reference is there any teaching or suggestion that good frames from a received transmission of one signal source can be used to substitute defective frames from another received transmission of another signal source, as claimed by Appellant. In the Mallory reference, the frame retransmission process involves a single sender and a single receiver (Mallory, column 2, line 62 to column 3, line 10). In the Campana reference as mentioned above and throughout the

Campana reference, all messages are partitioned, interwoven, and doubly *sent out of a single signal source*. Accordingly, the Mallory reference and the Campana reference, either individually or in any proper combination, do not teach or suggest Appellant's invention as presently claimed in independent claim 1.

Similarly, independent claims 19, 26 and 27 are corresponding apparatus claims and are submitted to be patentable for the same reasons that claim 1 is submitted to be patentable. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to independent claims 1, 19, 26 and 27.

Appellant respectfully requests the rejections of dependent claims 3 and 6-8 be reversed as the nonobviousness of independent claim 1 precludes rejections of claims 3 and 6-8 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. See *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), see also MPEP § 2143.03. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to dependent claims 3 and 6-8.

Appellant respectfully requests the rejections of dependent claims 20 and 22 be reversed as the nonobviousness of independent claim 19 precludes rejections of claims 20 and 22 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. See *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), see also MPEP § 2143.03. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to dependent claims 20 and 22.

D. Arguments for Patentability of Claims 2, 9-12, 14-17, 21, 24 and 25

- (1) *Claims 2, 9-12, 14-17, 21, 24 and 25 are patentable because the cited reference does not teach or suggest all of the claim limitations.*

Claims 2, 9-12, 14-17, 21, 24 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Mallory reference in view of the Campana reference and further in view of the Keskitalo reference. Appellant respectfully traverses this rejection, as hereinafter set forth.

Appellant respectfully requests the rejections of dependent claims 2, 9-12 and 14-17 be reversed as the nonobviousness of independent claim 1 precludes rejections of claims 2, 9-12 and 14-17 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to dependent claims 2, 9-12 and 14-17.

E. Arguments for Patentability of Claims 4, 5, 18 and 23

- (1) *Claim 18 is patentable because the cited reference does not teach or suggest all of the claim limitations.*

Claim 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Mallory reference in view of the Campana reference and further in view of the Alanara reference. Appellant respectfully traverses this rejection, as hereinafter set forth.

To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. “The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicants’ disclosure.” In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Appellant respectfully submits that a prima facie case of obviousness has not been established regarding claim 18 because the prior art cited does not teach or suggest all the claim limitations. Specifically, the cited prior art does not disclose or suggest Appellant’s claim elements of ***“forming a combined message by substituting each erased frame with a corresponding good frame”*** and ***“processing each of the plurality of ... received transmissions from the plurality of respective signal sources”*** as recited in Appellant’s invention as presently claimed.

The Final Office Action concedes:

Mallory does not teach combining a plurality of non-synchronous forward link received transmissions from a plurality of respective signal sources to recover a message comprised of a plurality of frames and processing the non-synchronous forward link received transmissions from the plurality of respective signal sources separately to recover the message. (Final Office Action, pp. 7-8; emphasis added).

The Final Office Action alleges:

Campana teaches combining a ***plurality of non-synchronous forward link received transmissions from a plurality of respective signal sources*** to recover a message comprised of plurality of frames and processing the non-synchronous forward link received transmissions from the plurality of respective signal sources separately ***to recover the message*** (see col. 59, lines 21-63 and multiple sources 124 in fig. 11 and the process of replacing error frames in fig. 33). (Final Office Action, p. 8; emphasis added).

The Final Office Action cites the Alanara reference for teaching or suggesting cycle redundancy checking. (Final Office Action, p. 8). Even assuming the Alanara

reference teaches or suggests as alleged, Appellant respectfully submits that the Campana reference is misconstrued and thereby inappropriately applied to Appellant's claims.

Appellant specifically claims, for example in claim 18, that to recover messages, among other things, by substituting "good frames" from one received transmission "for the erased frames" from another received transmission. "[E]ach of the plurality of [] received transmissions" is further recited in claim 18 as "from the plurality of respective signal sources."

Appellant herein sustains the above-proffered arguments, namely, that the *multiple sources* 124 in Fig. 11 of *Campana, Jr.* is not for a receiver to recover messages by substituting good frames from one received transmission of one signal source for the erased frames from another received transmission of another signal source. Instead, in the Campana reference the multiple sources are installed for a different purpose, more specifically, the multiple sources 124 are implemented for adequate communication coverage of a geographic area (Campana, column 57, lines 18-26). In the Campana reference, a message is doubly transmitted but delayed by a time delay interval (Fig. 8 and the relevant description of the Campana reference). However, the doubly transmitted message is transmitted not from a plurality of signal sources but rather from one source (Campana, Figs. 7A and 7B and the relevant description). Since each message is segmented, duplicated, and interleaved, each of the duplicated segment is separated by a time delay within the same message and then transmitted out of the same signal source. Repair of defective data segment is replacement of the delayed counterpart out of the *same message from the same signal source* (Campana, Fig. 33 and the relevant

description). Phrase differently, each receiver 104 is intended to receive a transmission from a single signal source 124.

Nowhere in the Mallory reference, the Campana reference or the Alanara reference is there any teaching or suggestion that good frames from a received transmission of one signal source can be used to substitute defective frames from another received transmission of another signal source, as claimed by Appellant. In the Mallory reference, the frame retransmission process involves a single sender and a single receiver (Mallory, column 2, line 62 to column 3, line 10). In the Campana reference as mentioned above and throughout the Campana reference, all messages are partitioned, interwoven, and doubly *sent out of a single signal source*. Accordingly, the Mallory reference and the Campana reference and the Alanara reference, either individually or in any proper combination, do not teach or suggest Appellant's invention as presently claimed in independent claim 18.

Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to claim 18.

- (2) *Claims 4, 5 and 23 are patentable because the cited reference does not teach or suggest all of the claim limitations.*

Claims 4, 5 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Mallory reference in view of the Campana reference and further in view of the Alanara reference. Appellant respectfully traverses this rejection, as hereinafter set forth.

Appellant respectfully requests the rejections of dependent claims 4 and 5 be reversed as the nonobviousness of independent claim 1 precludes rejections of claims 4 and 5 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to dependent claims 4 and 5.

Appellant respectfully requests the rejections of dependent claim 23 be reversed as the nonobviousness of independent claim 19 precludes rejections of claim 23 which depend therefrom because a dependent claim is obvious only if the independent claim from which it depends is obvious. *See In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), *see also* MPEP § 2143.03. Therefore, the Appellant requests that the Board reverse the 35 U.S.C. § 103(a) obviousness rejections to dependent claim 23.

(8) CLAIMS APPENDIX

A copy of claims 1-12 and 14-27 are appended hereto as Appendix A.

(9) EVIDENCE APPENDIX

NONE

(10) RELATED PROCEEDINGS APPENDIX


NONE

CONCLUSION

Appellant respectfully requests the reversal of the rejections of currently pending claims 1-12 and 14-27 for the reasons set forth above.

Respectfully,

Dated: September 17, 2007

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APPENDIX A

Claims Appendix

U.S. Patent Application No. 10/056,278

Filed: January, 23, 2002

1. (Previously Presented) A method for selectively combining a plurality of received transmissions from a plurality of respective signal sources to recover a message comprised of a plurality of frames, comprising:

processing each of the plurality of received transmissions from the plurality of respective signal sources separately to recover the message; and

if the message cannot be recovered error-free from a single received transmission,

determining erased frames in a message recovered from a first received transmission,

determining good frames recovered from remaining ones of the plurality of received transmissions,

forming at least one combined message, wherein each combined message includes a particular combination of good frames substituting for the erased frames, and

checking each combined message to determine whether it is good or erased.

2. (Previously Presented) The method of claim 1, wherein the first received transmission is one having a highest signal quality among the plurality of transmissions.

3. (Previously Presented) The method of claim 1, further comprising:
checking each frame in the message recovered from the first received transmission; and
marking each frame failing the checking as an erased frame.
4. (Original) The method of claim 3, wherein each frame is checked based on a set of cyclic redundancy check (CRC) bits generated for the frame.
5. (Original) The method of claim 1, wherein each combined message is checked based on a set of cyclic redundancy check (CRC) bits generated for the message.
6. (Previously Presented) The method of claim 1, wherein a single combined message is formed by
identifying each erased frame in the message recovered from the first received transmission,
identifying a good frame, from one of the plurality of received transmissions, corresponding to each erased frame, and
substituting each erased frame with the corresponding good frame to form the combined message.
7. (Original) The method of claim 1, wherein the good frame corresponding to each erased frame is identified based on a frame number associated with each frame.

8. (Previously Presented) The method of claim 1, wherein a plurality of combined messages are formed by

identifying a plurality of combinations of good frames for the erased frames in the message recovered from the first received transmission, and

substituting each combination of good frames for the erased frames to form a respective combined message.

9. (Previously Presented) The method of claim 1, further comprising:

if the message cannot be recovered error-free from a single received transmission and a good frame corresponding to a particular erased frame cannot be derived from a single received transmission,

combining symbols for two or more frames, from two or more received transmissions, corresponding to the erased frame; and

decoding the combined symbols to derive a good frame for the erased frame.

10. (Previously Presented) The method of claim 9, further comprising:

if the message cannot be recovered error-free from a single received transmission and a good frame corresponding to a particular erased frame cannot be derived from a single received transmission,

ranking the plurality of received transmissions, and wherein symbols for frames corresponding to the erased frames are combined in a particular order determined based on the ranking of the plurality of received transmissions.

11. (Previously Presented) The method of claim 10, wherein the plurality of received transmissions are ranked based on their signal quality.

12. (Previously Presented) The method of claim 9, further comprising:

if the message cannot be recovered error-free from a single received transmission and a good frame corresponding to a particular erased frame cannot be derived from a single received transmission,

weighting symbols for each of the two or more frames corresponding to the erased frame based on a respective weight determined based on the signal quality of the two or more transmissions from which the two or more frames are recovered, and wherein the weighted symbols are combined.

13. (Cancelled)

14. (Previously Presented) The method of claim 1, wherein each received transmission is a forward link signal from a respective base station in a CDMA system.

15. (Original) The method of claim 1, wherein the plurality of received transmissions are approximately synchronous.

16. (Original) The method of claim 1, wherein the plurality of received transmissions are asynchronous.

17. (Original) The method of claim 1, wherein the message to be recovered error-free is a page message.

18. (Previously Presented) A method for selectively combining a plurality of non-synchronous forward link received transmissions from a plurality of respective signal sources to recover a page message comprised of a plurality of frames, comprising:

processing each of the plurality of non-synchronous forward link received transmissions from the plurality of respective signal sources separately to recover the page message; and

if the page message cannot be recovered error-free from a single received transmission,

determining erased frames in a message recovered from a first non-synchronous forward link received transmission, based on a set of cyclic redundancy check (CRC) bits included with each frame,

determining a good frame, recovered from one of the plurality of non-synchronous forward link received transmissions, for each erased frame,

forming a combined message by substituting each erased frame with a corresponding good frame, and

checking the combined message based on a set of CRC bits included with the message to determine whether it is good or erased.

19. (Previously Presented) A receiver unit in comprising:

a demodulator operative to receive and process a plurality of signal instances in a received signal to provide a plurality of symbol streams, each symbol stream corresponding to a respective received transmission from one of a plurality of respective signal sources included in the received signal;

a decoder operative to process each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames;

a first detector operative to detect each frame in each recovered message as either a good frame or an erased frame;

a second detector operative to detect each recovered message as either a good message or an erased message; and

a frame assembler operative to form at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream, and

wherein the second detector is further operative to detect each combined message as either a good message or an erased message.

20. (Original) The receiver unit of claim 19, further comprising:

a frame buffer operative to store good frames recovered from the plurality of symbol streams.

21. (Original) The receiver unit of claim 19, wherein the decoder is further operative to combine symbols for two or more frames, from two or more symbol streams, corresponding to an erased frame, and to decode the combined symbols to derive a good frame for the erased frame.

22. (Original) The receiver unit of claim 21, further comprising:

a symbol buffer operative to store symbols corresponding to each erased frame in the message recovered from the first symbol stream.

23. (Original) The receiver unit of claim 19, wherein the first and second detectors are cyclic redundancy check (CRC) checkers.

24. (Original) The receiver unit of claim 19, wherein the message to be recovered error-free is a page message.

25. (Original) A terminal in a CDMA system comprising the receiver unit of claim 19.

26. (Previously Presented) A digital signal processor, comprising:

means for processing a plurality of signal instances in a received signal to provide a plurality of symbol streams, wherein each symbol stream corresponds to a respective received transmission from one of a plurality of respective signal sources included in the received signal;

means for decoding each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames;

means for detecting each frame in each recovered message as either a good frame or an erased frame;

means for detecting each recovered message as either a good message or an erased message; and

means for forming at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream, and wherein each combined message is detected to determine if it is a good message.

27. (Previously Presented) A receiver apparatus, comprising:

means for processing a plurality of signal instances in a received signal to provide a plurality of symbol streams, wherein each symbol stream corresponds to a respective received transmission from one of a plurality of respective signal sources included in the received signal;

means for decoding each of the plurality of symbol streams separately to recover a respective message comprised of a plurality of frames;

means for detecting each frame in each recovered message as either a good frame or an erased frame;

means for detecting each recovered message as either a good message or an erased message; and

means for forming at least one combined message, if a message cannot be recovered error-free from a single symbol stream, wherein each combined message includes a particular combination of good frames substituting for erased frames in the message recovered from a first symbol stream, and wherein each combined message is detected to determine if it is a good message.